

ABSTRACT

A system and a method are provided for performing an integrated uncertainty analysis on a system having interacting modules. The interaction of the modules includes data transfer between the modules with the output of one module being indicative of the input of another module. An uncertainty analysis is performed on each module based on given probability density functions of each input to the module. The uncertainty analysis may include developing a deterministically equivalent model for one or more modules. Data may be provided from one module to another in a uniform format. Thus, two or more modules may be integrated with uncertainties in the inputs of one module being effectively propagated to the inputs of another module. A plurality of modules may thus be modeled as a single integrated system. The integrated system may be replaced with a deterministically equivalent model, preferably of a further reduced order. In this manner, key uncertainties in particular inputs may be isolated. Once these inputs are identified, resources may be effectively allocated to minimize the impact of those inputs on the variability of the results.